

The natural history of the Beaumaris Peninsula and its influence on human activity

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Introduction

The Beaumaris Peninsula has been visited by semi-nomadic aborigines for over 6000 years, and occupied by sedentary whites since the 1840's. Both were attracted by what the land and sea had to offer. For the aborigines, there was game to be had, food from a variety of native plants, and an abundant supply of fish and shellfish. White pioneers saw its potential at first as a pastoral area, and also as a source of fish.

Economic pursuits such as these were carried out in the context of a most attractive environment - multi-coloured cliffs and sandy beaches, backed by rolling sand hills clothed in a rich variety of flora. The land supported large numbers of birds, marsupials, reptiles and insects, whilst near shore, the reefs were crowded with invertebrate animals and fish. As a natural area it was richly endowed - and in some respects, unique in the Port Phillip region.

In recent times, particularly since World War II, rapid growth occurred, and the natural features of the Peninsula were overlaid by a cloak of urban residential development. Land prices rose as tracks were widened and sealed to form roads. As houses sprang up amongst the Tea-tree and heath, marsupials and reptiles receded, some into oblivion. As swamps were drained, aquatic birds disappeared, to give way to sports grounds, houses, shopping centres, and schools.

The distinctive natural character of the Peninsula nevertheless remains, and is enjoyed by all that are fortunate enough to reside there. Nevertheless it can not be fully appreciated without some knowledge of its evolution and natural history, and it is to that area that we first turn.

The Deep Geological Past

Some 80 metres below the Peninsula, is a buried mountain range of Silurian rock. It was formed of sediments laid down some 400 million years ago and compressed into fold mountains. These were then rendered flat - worn away by erosion during the next 150 million years.

The Beaumaris 'Peninsula'. The term is used loosely to refer to the 'V' shaped intrusion of land into the Bay that is spearheaded by Table Rock Point, Beaumaris.

In those times, individual continents as we know them today did not exist. They were all part of one landmass - the super-continent Pangaea. It began to break up and drift apart only about 180 million years ago. At first it separated into two parts - the northward drifting Laurasia and the

more southerly mass called Gondwana. Australia was part of Gondwana, and even then the area which was to become Port Phillip Bay was part of a subsiding lowland situated near the edge of the drifting continent. Australia became isolated, and sea invaded the coastal lowlands. For a long time, rivers deposited gravel and sand on top of the Silurian rock to form what is known as the Fyansford formation. Fossil remains of shelly fauna can be found in these sediments, where they are seen at the surface near the area occupied by Keefer's Fishermans Wharf.

The Formation of Surface Rocks

Sitting on top of the Fyansford formation are two layers of sedimentary rock that are visible around the Black Rock and Beaumaris coast. The bottom layer of the two (Black Rock Sandstone) is harder and darker in colour than the top layer (Red Bluff Sandstone), but geologically they appear to be closely related. About 12 million years ago, sea level fell slightly and the hinterland of Port Phillip Bay was uplifted. This rejuvenated streams flowing into the Bay, and they deposited about 15 metres of coarse, iron-rich sand on top of the Fyansford Formation. Shells and woody material became embedded in the sands, and appears in fossilised form in the rock of the shore platforms at Black Rock and Beaumaris.

Some 7 million years ago, a similar process of hinterland uplift and stream rejuvenation occurred, but this time the newly deposited sands were less rich in iron oxides. They formed a rock that is therefore softer than the Black Rock Sandstone. The new mass reached a depth of 24 metres, and is known as Red Bluff Sandstone. These layers were deposited on the sea floor at that time. Then there followed a period of uplift and gentle folding which brought them above sea level and created a low plateau of elevated land, part of which is the Beaumaris Peninsula. Wave erosion cut the sandstones back to form the cliffed coastline we know today. The folded rocks are seen in exposed and submerged nearshore reefs, and cliffed headlands where upfolds bring the harder Black Rock Sandstone above sea level. Sandy beaches formed in the intervening downfolds that bring the softer Red Bluff Sandstone below sea level.

The Colour of Coastal Rocks

The Black Rock Sandstone appears as the brown or dark brown strata forming the base of most cliffs, and all shore platforms and reefs. The softer Red Bluff Sandstone overlies it, which is often yellowish-orange in overall appearance. However, closer examination may reveal smaller segments of several other colours as well. Much of this colouration is probably due to the mineral glauconite. This is an iron bearing compound which, when oxidised forms iron oxides which are yellow, orange, red or brown in colour, and form a coating on the quartz grains. Colouration of this type is most notable in the Red Bluff Cliffs. Iron oxides are dissolved away in some places, leaving the sandstone grey or white, as in the cliffs at Black Rock Point.

Fossils In Coastal Rocks

In addition to fossilized shell and wood already mentioned above, the lower levels of the cliffs behind Keefer's Fishermans Wharf contain fossil shells, sea urchins, crabs, foraminifera, remains of whales, sharks, rays and dolphins, and also birds and marsupials. These fossils date back to Upper Miocene to Early Pliocene times (12 to 6 million years ago). It is regarded as a site of international significance.

The Hinterland

Two million years ago the Earth's climate became much colder and glaciers and ice sheets formed in polar and mountain regions. There were oscillations of climate, the colder glacial phases interspersed by warmer, drier periods, and during these drier times, the unconsolidated surface sands of the Beaumaris plateau were formed into parallel ridges by the prevailing north-westerly winds (see figure 2). Seasonal streams and swamps sometimes occupied the low corridors (swales) between the ridges. Beaumaris High School was built on the site of one such swamp, which extended across Balcombe Road to Balcombe Park Reserve. Though the swamp has long since been drained, the course of the seasonal stream with which the swamp was associated, is still marked by a line of River Red Gums at the rear of the School. It is the last stand in the local region of this once common wetland species. This is but one example of the way in which an understanding of the geological evolution of a region can throw light on present day phenomena. In the following section, an attempt will be made to develop this theme, by drawing together connections between geology, natural processes and the activities of humans.

The Influence of Geology on Fauna and Flora

Marine Life

Migratory and free-ranging fish visit local coastal waters, but there are permanent populations of territorial fish such as Blennies and Zebra Fish. There are communities of invertebrate animals ranging from worms, sponges, seastars and sea urchins to anemones, crabs, molluscs and tunicates. They form an ecosystem at the base of which are the water plants, notably seaweeds, which provide food, protection and other services to the animals of the ecosystem. Seaweeds, in turn, require a firm substrate on which to attach themselves. This is provided by the upfolds of Black Rock Sandstone, which form the reefs and shore platforms of the area. Were it not for these upfolds, the nearshore waters surrounding the Beaumaris Peninsula would comprise a sandy and relatively lifeless desert.

Land Plants and Animals

The geological evolution of the Beaumaris Peninsula has given rise to four broad floral habitats - coastal, woodland, heathland and swamp. Each of these habitats is influenced by the shape and composition of the substrate, that is, by the landforms and soil characteristics of a given locality. Each will be considered briefly, in turn.

Coastal

Coastal vegetation has become highly specialised to cope with the salt-laden and abrasive winds. It therefore differs considerably from inland species. It is adapted to the alkaline and low-nutrient soils that derive from Red Bluff and Black Rock sands. Coast Banksia, Coast Tea-tree and Drooping She-oaks typify this area. The coastal soils are rich in iron, but poor in phosphorus. Thus the leaves of a Coast Banksia, deprived of iron, will turn yellow and wither. On the other hand, if an all-purpose fertiliser (which contains phosphorus) is applied, it can actually kill the tree. From

examples such as this, the closeness of the link between geological inputs and biological outcomes is apparent.

Heathland

Heathland vegetation is confined largely to the sand-ridges, particularly the more ancient ones. Here the sands are acidic, and almost devoid of plant nutrients - the result of leaching rains carrying soluble minerals to lower levels over very long periods of time. Whereas heaths might be out-competed in some habitats, they have little or no competition in ancient sand-ridge country. Woodland: Woodland species generally occupy the swales that lie between the sand-ridges. Here, sandy loams derived from the parent sandstone, cover heavier soils, and woodland species have developed in such places. Typically, the area would be dominated by eucalypts, especially the Manor Gum, with the addition of wattles and a few casuarinas. Native grasses and low shrubs are also common in woodlands, and give them a savanna-like appearance. They would be a habitat favoured by kangaroos, wallabies and koalas.

Swamp: Swamps formed in hollows - the low points of the swales. Here, water carrying leached iron minerals reacted with the humic acid of rotting vegetation to form an impervious layer known as 'coffee rock' in the subsoil. This allowed water to persist in the hollows, instead of draining away through the sand. Typical vegetation included the Scented Swamp Paper-bark. Clay-based swamps tended to form in association with seasonal streams and gave rise to distinctive vegetation types including the Swamp Gum and the River Red Gum. 'Long Hallow' swamp, over which Beaumaris High School was built, was of this type.

Geological processes occurring in the deep past bear directly and intimately on the nature of the flora of modern times. These same geological processes also influence the fauna, though sometimes indirectly through plants, for the four vegetation types just discussed were home to a variety of animals. Early accounts mention kangaroos, wallabies, wild cats and wombats, koalas, possums, bandicoots, snakes, lizards - and even an occasional dingo. There were birds too - snipe, parrots, quail, bronzewing; ducks, cormorants, herons and pelicans; harriers, kites and other birds of prey, birds too numerous to mention, occupying every nook and niche within the wide range of coastal and inland habitats.

Some of these animals would have been wide ranging, the birds of prey for example, whilst others were more or less confined to specific habitats. Koalas, for example, were dependent on specific species of woodland eucalypts. All, of course, had a role to play in the changing ecosystem. As landforms and soils continued to evolve, and climates fluctuated, adjustments were required by the fauna and flora. However, the fauna and flora that existed when Europeans first arrived, had probably not changed greatly since the beginning of the Holocene Epoch (10,000 years ago), following the last glacial phase.

The Effect of Natural History on Human Occupation

Aborigines

The Bunurong Tribe of aborigines travelled as far south as Anderson's Inlet in South Gippsland. In their semi-nomadic wanderings along the coast, they collected such food as was available - in spring, swans' eggs from French Island in Westernport Bay, for example. It seems likely that the more westerly clans would have spent the warmer months on the Beaumaris Peninsula. Two factors suggest this. They spent considerable time fishing and collecting shellfish, and the preferred time for this would be in summer, as the Bay temperature falls to 8 degrees Celsius in winter. The second is that they placed considerable importance on the seepage-fed fresh water wells at the foot of the sea cliffs. At cooler times of the year, seasonal streams would have rendered such wells unimportant.

In a curious way, their shellfish eating habits also suggest that they appreciated the natural beauty of the Peninsula, in the same way that we do today. The location of two major cooking and eating spots (kitchen middens) are at Table Rock Point and Black Rock Point. These sites are by no means the only ones close to shellfish habitats, but may have been preferred because of the beauty of their sandstone structures, and the views they afford - both of the Bay and, as they prepared their evening meal, of the setting sun. Another advantage of these elevated sites was their exposure to sea winds, which would get the fires burning well as they cooked the shellfish.

Before the white invasion of their lands, a wide range of game was available to the aborigine. Some (koalas, possums, snakes and lizards) would have been a good deal easier to catch than others (kangaroos, wallabies, birds, etc.). In any event, game was not usually the main source of food for the aborigine. Most came from gathering by women and children. Apart from shellfish gathering, many coastal and inland plants offered a source of nourishment. Banksia flower spikes were soaked in water, and the nectar dissolved out to make a sweet drink; leaves of some plants are edible (such as Bower Spinach), fruits of others were eaten such as that of Pig-face. Some plants were uprooted for their tubers. It is worth noting that plants also provided a range of useful items - twine, basket material, clothing, canoes, weapons and tools, glues, medicines, fish poisons, fire sticks and fuel.

Clearly the natural history of the area had given rise to a place of aesthetic appeal and great utility to the Bunurong. Therefore as they journeyed northward past the Carrum Wetlands, and looked across to the Beaumaris Peninsula, it is difficult to avoid the assumption that they did so with considerable pleasure.

Europeans

White settlement of the Beaumaris Peninsula began in 1845, when the Mosey family leased a run in the area of the present Beaumaris Hotel. The woodlands were turned over to stock, and fruit and vegetables were grown and sold. By 1852, almost the entire region between South Road and Beaumaris Bay had been divided into lots varying from 40 to 300 acres, and sold. However, it seems that many purchasers bought with the idea of sub-division and resale in mind rather than agriculture. Thus from this early stage, the region appeared destined to become urban residential. The land that served the Aborigine so well was in many respects unsuited to Western agriculture, yet it had much potential in other ways. The spectacular coastline attracted holidaymakers,

picnickers and swimmers. Hotels and holiday places sprang up, and botanical excursions were conducted for interested visitors. Most development occurred along the seaboard in the first few decades, leaving the ridge and swale country of the sandbelt untouched. By 1880, The Royal Melbourne Golf Club had made its first purchase of this land - and so marked the beginning of golf as a major land use, with five contiguous courses eventually becoming established. Throughout the 20th Century, housing crept inland until it met up with the sand-belt golf courses. In more recent decades, light industrial development has also taken place in the ridge and swale country of the inland.

Along the coast, sporadic shellfish harvesting occurred, and a number of commercial fishermen operated from Sandringham and Black Rock as early as the 1850's, which had its parallel in Aboriginal activity.

Generally, the natural environment influenced European occupation in a different direction from that of the Aborigines. In the process of the European occupation, much of the natural heritage has been disguised or destroyed. Of the 430 plant species of Aboriginal times, 246 are now deemed to be locally extinct. The major cause was habitat destruction. Marine communities of the coastal fringe have suffered a similar fate as the result of over-harvesting (particularly of shellfish) and pollution. The vast majority of land animals have disappeared. A few, such as possums, Bluetongue lizards and skinks manage to survive in urban and semi-urban environments.

In some places, the topography has been noticeably modified. In the interest of safety, some coastal cliffs have been artificially shaped into gentler bluffs, whilst some beaches disappeared - the unintentional side effect of the construction of sea walls and a breakwater. However, the landforms of the coast generally retain their original character. Inland, the sand-ridge and swale formations are intact, though as we most often experience them - lined with asphalt or covered by buildings - they may be hard to recognise. They are far less modified in the golf country and on the Royal Melbourne and the Municipal Courses particularly, patches of native heath can still be seen. No widespread patches of woodland remain in the region, and swamps, along with most of their attendant vegetation, have been completely wiped out.

Despite these losses and modifications, the Peninsula retains something of its original character. Remnant patches of heathland have been carefully preserved in small reserves, whilst Beach Park is one of the less disturbed parts of the metropolitan coast. It may be that many of the people who came to live in the area, sense and appreciate the special qualities of its natural heritage. They attempt to perpetuate it by planting or retaining native species in their gardens, and elect representatives who will act in a like manner in public places. Local authorities, conservationists, teachers and many others work to retain a connection with the product of geological and biological evolution, regarding as precious, whatever part of it remains.